The IASLC Lung Cancer Staging Project: Proposals for Coding T Categories for Subsolid Nodules and Assessment of Tumor Size in Part-Solid Tumors in the Forthcoming Eighth Edition of the TNM Classification of Lung Cancer

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ABSTRACT

This article proposes codes for the primary tumor categories of adenocarcinoma in situ (AIS) and minimally invasive adenocarcinoma (MIA) and a uniform way to measure tumor size in part-solid tumors for the eighth edition of the tumor, node, and metastasis classification of lung cancer. In 2011, new entities of AIS, MIA, and lepidic predominant adenocarcinoma were defined, and they were later incorporated into the 2015 World Health Organization classification of lung cancer. To fit these entities into the T component of the

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**See Appendix for the members of the International Association for the Study of Lung Cancer Staging and Prognostic Factors Committee and Advisory Board Members.

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staging system, the Tis category is proposed for AIS, with Tis (AIS) specified if it is to be distinguished from squamous cell carcinoma in situ (SCIS), which is to be designated Tis (SCIS). We also propose that MIA be classified as T1mi. Furthermore, the use of the invasive size for T descriptor size follows a recommendation made in three editions of the Union for International Cancer Control tumor, node, and metastasis supplement since 2003. For tumor size, the greatest dimension should be reported both clinically and pathologically. In nonmucinous lung adenocarcinomas, the computed tomography (CT) findings of ground glass versus solid opacities tend to correspond respectively to lepidic versus invasive patterns seen pathologically. However, this correlation is not absolute; so when CT features suggest nonmucinous AIS, MIA, and lepidic predominant adenocarcinoma, the suspected diagnosis and clinical staging should be regarded as a preliminary assessment that is subject to revision after pathologic evaluation of resected specimens. The ability to predict invasive versus noninvasive size on the basis of solid versus ground glass components is not applicable to mucinous AIS, MIA, or invasive mucinous adenocarcinomas because they generally show solid nodules or consolidation on CT.

Keywords: Adenocarcinoma in situ; Lepidic predominant adenocarcinoma; Lung cancer; Lung cancer staging; Minimally invasive adenocarcinoma; TNM classification; Tumor size

Introduction

This article addresses fundamental changes in pathologic and clinical classification of lung adenocarcinoma with an impact on the upcoming revision of the tumor, node, and metastasis (TNM) classification of lung cancer, specifically, proposals for revision of the T categories. Until the 2011 International Association for the Study of Lung Cancer (IASLC)/American Thoracic Society (ATS)/European Respiratory Society (ERS) lung adenocarcinoma classification, the World Health Organization (WHO) classification of lung cancer recognized only an in situ (Tis) category for squamous cell carcinoma.[1] As squamous cell carcinoma in situ (SCIS) is not readily measurable for tumor size, this concept had no implication for measurement of T descriptor size. However, the IASLC/ATS/ERS lung adenocarcinoma classification defined new entities of adenocarcinoma in situ (AIS) (Table 1), minimally invasive adenocarcinoma (MIA) (Table 2), and lepidic predominant adenocarcinoma (LPA).[2] This has now been formally adopted by the 2015 WHO Classification.[3] This conceptual change opened up a new way of thinking about how to measure tumor size in lung adenocarcinoma and how to stage AIS, MIA, and invasive adenocarcinomas with a lepidic component.

To fit the entities of AIS, MIA, and LPA into the categories of the T component of the classification for lung adenocarcinoma, we propose introducing Tis (AIS), to be distinguished from Tis (SCIS) now that in situ carcinoma of the lung can be either SCIS or AIS. Because AIS can accompany squamous cell carcinoma and SCIS can accompany adenocarcinoma, it is useful to specify the histologic type of in situ carcinoma (AIS versus SCIS) for purposes of accurate coding. In addition, we propose that MIA of the lung be classified as T1mi. Furthermore, for nonmucinous lung adenocarcinomas with a lepidic component, we propose using invasive size for T descriptor size, as recommended by the Union for International Cancer Control (UICC) TNM supplements since 2003.[4–6]

In lung adenocarcinomas, the computed tomography (CT) findings of ground glass versus solid opacities tend to

Table 1. Adenocarcinoma In Situ

Pathologic criteria
- A small tumor ≤3 cm
- A solitary adenocarcinoma[a]
- Pure lepidic growth
- No stromal, vascular, or pleural invasion
- No pattern of invasive adenocarcinoma (such as acinar, papillary, micropapillary, solid, colloid, enteric, fetal, or invasive mucinous adenocarcinoma)
- No spread through air spaces
- Cell type mostly nonmucinous (type II pneumocytes or Clara cells), rarely may be mucinous (tall columnar cells with basal nuclei and abundant cytoplasmic mucin, sometimes resembling goblet cells)
- Nuclear atypia is absent or inconspicuous
- Septal widening with sclerosis/elastosis is common, particularly in nonmucinous adenocarcinoma in situ

[a]When multiple adenocarcinomas in situ are found, they should be regarded as separate primaries rather than intrapulmonary metastases.
Modified with permission from Travis et al.[2] and Travis et al.[3]

Table 2. Minimally Invasive Adenocarcinoma

Pathologic criteria
- A small tumor ≤3 cm
- A solitary adenocarcinoma[a]
- Predominantly lepidic growth
- Invasive component ≤0.5 cm in greatest dimension in any one focus
- Invasive component to be measured includes
  1. Any histologic subtype other than a lepidic pattern (such as acinar, papillary, micropapillary, solid, colloid, fetal, or invasive mucinous adenocarcinoma)
  2. Tumor cells infiltrating myofibroblastic stroma
- The diagnosis of minimally invasive adenocarcinoma is excluded if the tumor
  1. Invades lymphatics. blood vessels, air spaces, or pleura
  2. Contains tumor necrosis,
  3. Spread through air spaces
- The cell type in most cases consists of nonmucinous (type II pneumocytes or Clara cells), but rarely may be mucinous (tall columnar cells with basal nuclei and abundant cytoplasmic mucin, sometimes resembling goblet cells)

[a]When multiple adenocarcinomas in situ are found, they should be regarded as separate primaries rather than intrapulmonary metastases.
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